THE MINERAL INDUSTRIES OF MALI, MAURITANIA, AND NIGER

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MALI

Mali is a landlocked country in West Africa that is bordered by Algeria, Burkina Faso, Côte d'Ivoire, Guinea, Mauritania, Niger, and Senegal. In 2004, the population was estimated to be about 12 million with an estimated growth rate of about 2.78%. The country's total land and water area is 1.24 million square kilometers (km^2), which is comparable to slightly less than twice the size of the State of Texas (U.S. Central Intelligence Agency, 2004§[1]). According to International Monetary Fund (IMF) (2005, p. 15-16) reports, Mali's gross domestic product (GDP) growth rate declined to 2.2% in 2004 from 7.4% in 2003. The decline was attributed to lower grain and gold outputs. The IMF (2005§) estimated Mali's GDP based on purchasing power parity to be about $12.5 billion and the per capita GDP based on purchasing power parity to be $1,024 in 2004.

Mali's mineral sector was dominated by gold mining which, according to the Organisation for Economic Co-operation and Development (2005, p. 297), accounted for about 57% of exports and 11% of the GDP in 2003. Malian gold exports as a percentage of the GDP increased to 15.1% from 2% between 1996 and 2002. Other mineral commodities produced in the country were clay, gypsum, limestone, marble, salt, sand and gravel, and stone for domestic consumption. Despite being able to produce many of the commodities used in the construction sector, the country imported about 70% of its construction material needs, including cement (Organisation for Economic Co-operation and Development, 2005, p. 297).

The Government agency responsible for the mining sector in Mali is the National Directorate for Geology and Mines, which is part of the Ministry of Mines, Energy and Water Resources. Although several old and new gold mines were expected to come into production during the next 2 years, the mining sector was still underdeveloped owing, in part, to the lack of appropriate infrastructure to support mining activities. Institutional reforms to improve the country's infrastructure, however, were underway. In 2003, the Government began the process of revising the Mining Code for the second time since the establishment of the Code in 1991 (African Mining Intelligence, 2004; Organisation for Economic Co-operation and Development, 2004, p. 197).

In terms of its geologic framework, Mali is located on two principal structural units: the West African craton and the Tuareg shield. The geology of the West African craton, which comprises two main outcrops of crystalline rocks (Bougouni and Kenieba) consists of vast gneisso-granitic complexes and Birrimian greenstone belts. The Bagoe belt, which is located within the Bougouni area, extends along the Bagoe River and hosts the Syama gold deposit. The belt consists mainly of schists and greywackes flanked on both sides by andesites and basalts that locally contain jasper. The Kenieba area is formed by marble, greywackes, schists, and several horizons of tourmalinized or gold-bearing sandstones. A northern formation within the Kenieba area comprises andesites, basalts, and a series of sandstones, greywackes, and polymict conglomerates above Birrimian rocks. About 20 kimberlite pipes intrude the Kenieba basement rocks and the Taoudeni Basin. The Taoudeni Basin covers about two-thirds of Mali's territory (Kusnir, 1999).

Most of Mali's mineral deposits occur to the east and west of the country; diamond occurs mainly in the Kenieba area. Iron occurs in various geologic settings and types of deposits, the most important being the oolitic ironstones in the late Proterozoic sediments between the Bafing and the Bakoye Rivers west of Bamako. A manganese deposit consisting of oxides on weathered gondites occurs to the east of the country. Bauxite deposits overlie late Proterozoic to Permian dolerites and occur in the western portion of the country along the Guinean border. The thickness of the bauxite deposits averages about 10 meters (m) and the Al_2O_3 content in these deposits varies from 39% to 48%. Lithium deposits from spodumene-bearing pegmatites occur in the southwest within the Bougouni area. Apatite, mica, niobium (pyrochlore), and rare-earth minerals are found in carbonatites along the eastern edge of the West African craton. Industrial minerals include barite, diatomite, fluorspar, kaolin, limestone, ornamental stone, and salt. Phosphate resources are located to the south and west of the Adrar des Iforas region. Limestone deposits are located in western Mali near the Bamako-Dakar railway southeast of Kayes. The In Kereit gypsum deposit is located north of the Adrar des Iforas. Gypsum also occurs together with salt in the Taoudeni area within Quaternary sabkhas. Lignite and oil shale are said to occur to the west and southeast of the Adrar des Iforas. Birrimian greenstones that cover an area of about 23,000 km^2 host most of Mali's known gold deposits. Primary mineralization is said to be almost exclusively of two types: lode mineralization, with native gold in quartz veins and/or in sulphides disseminated in hosting rocks; and stratabound mineralization in tourmalinized quartzites. Gold also occurs in elluvial and alluvial placers, which are the main source of gold mined by artisans (Kusnir, 1999).

In 2004, at least 21 companies were engaged in gold exploration in Mali. These included Adven Inc. of the United States; Afcan Mali S.A. (a subsidiary of Afcan Mining Corp. of Canada); African Metals Corporation (AMC) of Canada; AfriOre Limited; AngloGold Ashanti Ltd., which was formed by the merger of AngloGold Limited of South Africa and Ashanti Goldfields Ltd. of Ghana in April 2004; Avnel Gold Mining Ltd. of the United Kingdom; Axmin Inc. of Canada; Delta Exploration Inc. of Canada; Etruscan Resources Inc. of Canada; Glencar Mining plc; Golden Star Resources Ltd. (GSR) of the United States; Great Quest Metals Ltd. of Canada; Hyundai Corporation of the Republic of Korea; IAMGOLD Corp. of Canada; Nevsun Resources Ltd. of Canada;

[1]References that include a section mark (§) are found in the Internet References Cited sections.

North Atlantic Nickel Corp. of Canada; Randgold Resources Ltd. of the United Kingdom; Resolute Mining Limited of Australia; Robex Resources Inc. of Canada; and West Africa Gold Inc.

Malian gold production was primarily from the Kalana, the Morila, the Sadiola Hill, and the Yatela Mines, although some gold [about 60 kilograms per year (kg/yr)] was also produced by artisanal methods. Production at the Kalana underground mine, which had been closed in 1991, restarted in January 2004. The four mines produced a total of 37,912 kilograms (kg) of gold in 2004 (table 1).

Gold production at the Morila open pit gold mine dropped to 15,878 kg in 2004 from 24,696 kg in 2003. Randgold attributed the 35.7% decrease in production to the mining of the lower-grade parts of the ore body and the failure to increase tonnage throughput to process lower-grade ore as a result of the delay in the commissioning of a new plant expansion. Other cited reasons for the decrease in production were unstable milling performance, carbon-in-leach (CIL) tank downtime, unscheduled shutdowns of the pre-CIL circuit, and poor maintenance. The company had planned to increase throughput at the plant in 2004 to 350,000 metric tons per month (t/mo) from 250,000 t/mo. The Morila Mine was owned by Morila S.A. (a subsidiary of Morila Limited of Mali) (80%) and the Government of Mali (20%). Morila Limited was a 50-50 joint venture of AngloGold Ashanti and Randgold. In 2004, total indicated, inferred, and measured resources at Morila were reported to be 33.75 million metric tons (Mt) at a grade of 3.28 grams per metric ton (g/t) gold. Randgold estimated that mining activities at Morila would last until 2008 based on current mining rates and reserves, and that the processing of stockpiles would continue until 2011 (Randgold Resources Ltd., 2005, p. 14-17).

Randgold, through Société des Mines de Loulo, held an 80% interest in the Loulo gold mine, which was under development in 2004. The Loulo gold mine is located near the Faleme River about 350 kilometers (km) west of Bamako, 220 km south of Kayes, and about 96 km from the Sadiola gold mine. It contains two major deposits: Loulo 0 and Yalea. In 2003, the Board of Randgold approved the development of the mine following the completion of a feasibility study and, in 2004, Randgold awarded a contract to BCM Mali S.A. (a subsidiary of BCM International Ltd) for the operation of the mine. The first facility construction works began in October. The mine was scheduled to go into production in mid-2005 and was expected to produce an average of about 6,200 kg/yr of gold. Measured and indicated mineral resources at Loulo 0 were estimated to be about 15.87 Mt at a grade of 4.05 g/t gold, and inferred resources, 1.7 Mt at a grade of 5.24 g/t gold. At Yalea, measured and indicated resources were estimated to be about 15.34 Mt at a grade of 4.05 g/t gold, and inferred resources, 18.76 Mt at a grade of 5.31 g/t gold (Randgold Resources Ltd., 2005, p. 23-25).

SRK Consulting Co. completed a prefeasibility study to examine the potential for the development of two underground mines as deep extensions of the ore bodies below the open pit reserves at Loulo 0 and Yalea. Randgold commissioned SRK Consulting to lead a definitive underground development study of the project based on the potential for positive results yielded by the prefeasibility study. A budget of $7 million was approved for the project (African Mining, 2004; Randgold Resources Ltd., 2005, p. 28).

In June, Randgold announced the sale of its 80% stake in the Syama gold mine to Resolute. Resolute paid Randgold $6 million and assumed liabilities of $7 million. Randgold will receive a royalty on production of $10 per ounce on the first million ounces attributable to Resolute and $5 per ounce on the next 3 million attributable ounces at a gold price of $350 per ounce. The Malian Government held the remaining 20% interest in Syama. The Syama gold mine is located in southern Mali about 300 km southeast of Bamako. The mine was acquired by Randgold in 1996, but operations were suspended in 2001 following a drop in gold prices. Syama was put on care and maintenance status in 2002 (Randgold Resources Ltd., 2004; 2005, p. 32).

Gold production at the Sadiola Hill open pit gold mine increased to 14,277 kg in 2004 from 14,059 kg in 2003. Sadiola Hill was owned by La Société d'Éxploitation des Mines d'Or de Sadiola S.A. (Sadiola) [a joint venture of AngloGold Ashanti (38%), IAMGOLD (38%), the Government of Mali (18%), and the World Bank's International Finance Corporation (6%)]. Total measured and indicated resources at Sadiola were reported to be 39.0 Mt of ore at a grade of 2.8 g/t gold. Total inferred resources were reported to be 64.7 Mt at a grade of 2.4 g/t gold (IAMGOLD Corp., 2005, p. 15). Infill drilling of the sulfide at Sadiola was completed in 2004. AngloGold Ashanti planned to focus exploration on potential oxide targets within the Sadiola concession in 2005 (AngloGold Ashanti Ltd., 2005, p. 41).

Gold production at the Yatela open pit mine, which opened in 2001, was 7,527 kg in 2004 compared with 6,781 kg in 2003. The mine was owned by La Société d'Éxploitation des Mines d'Or de Yatela S.A. (Yatela) [a joint venture of AngloGold Ashanti and IAMGOLD (40% each) and the Government of Mali (20%)]. AngloGold Ashanti was the mine operator. Total measured and indicated resources at Yatela were reported to be 16.6 Mt at a grade of 2.5 g/t gold. Total inferred resources were reported to be 2.9 Mt at a grade of 3.2 g/t gold. IAMGOLD reported that mining operations at Yatela were expected to end by 2007 at current mining rates because the exploration potential at Yatela was limited and significant levels of additional mineral resources were not expected to be found (IAMGOLD Corp., 2005, p. 6).

The Kalana Mine, which was owned by Société de la Mine d'or de Kalana [a joint venture of Avnel (80%) and the Government of Mali (20%)], produced 230 kg of gold in 2004. Production at the redeveloped underground mine, which is located about 300 km south of Bamako, was restarted in January. The mine had been closed in 1991. Avnel expected mine production to increase to its design capacity of 60,000 metric tons per year (t/yr) of ore in 2007 from the 32,000 t/yr of ore produced in 2004 as new mining areas are opened and the shaft-deepening to access new veins is completed. During the shortfall in underground production between 2004 and 2006, the company planned to mine gold from surface sources, which included the 10,000 metric tons (t) of coarse sand dumps generated from tailings during 2004 that reportedly contained an average grade of 5.0 g/t gold. A revamped gravity plant was commissioned during the year; the gold recovery rate at the plant ranged between 79% and 84%. Phase 1 of a geochemical soil-sampling program was completed in 2004; Phase 2 was scheduled to be completed in 2005 (Avnel Gold Mining Ltd., 2005§).

The Government awarded five onshore petroleum exploration permits in northern Mali to Baraka Mali Ventures Ltd. of Australia. The permits were for Blocks 1, 2, 3, 4, and 9 within the Taoudeni Basin in the Sahara Desert. Baraka was to invest $51 million over the next 4 years across all five permits (Oil & Gas Journal, 2004).

Outlook

AngloGold Ashanti planned to continue studying identified potential oxide targets at the Sadiola property, but expected production at the Sadiola Mine to decrease by 2% in 2005 compared with that of 2004. At the Yatela property, the company planned to continue to study the potential for sulfide ore below the Alamoutala deposit and expected production at the Yatela Mine to increase by 10%. AngloGold Ashanti also planned to continue exploration drilling at Samacline, which was located west of the Morila pit, and expected its share in production to increase to about 8,000 kg in 2005 compared with about 6,300 kg produced in 2004 (AngloGold Ashanti Ltd., 2005, p. 41-43).

In spite of the favorable production outlook for the Yatela Mine in 2005 and the additional future production that will result from the development of the Kalana and the Loulo Mines, the new production is not likely to counterbalance the loss in production that will result from the eventual depletion through mining of the Morila and the Yatela Mines beyond 2008.

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MAURITANIA

Mauritania is bounded on the north by Morocco, on the northeast by Algeria, on the west by the Atlantic Ocean, on the east and southeast by Mali, and on the south by Senegal. In 2004, the population was estimated to be about 3.0 million. The country's total land and water area is about 1 million km^2, which is slightly larger than three times the size of New Mexico (U.S. Central Intelligence Agency, 2004§). The country's GDP based on purchasing power parity was estimated to be about $6.4 billion in 2004; the per capita GDP based on purchasing power parity was about $2,200 (International Monetary Fund, 2005§). Mining accounted for about 10% of the GDP and iron ore exports accounted for about 60% of the country's total exports (International Chamber of Commerce, 2004, p. 38).

According to the International Chamber of Commerce (2004, p. 9) Mauritania has been implementing economic, political, and social reforms since 1985. Government policies implemented throughout this period have allowed for state withdrawal from the parapublic sector through privatization, liquidation of nonstrategic public enterprises, suppression of monopolies, and the liberalization of the economy. Initially, the privatization policy was aimed at businesses that held no strategic interest for the country, but eventually in 1999, the Government began privatizing the enterprises it believed to be of strategic interest, such as the telecommunication, air transport, and energy sectors. Foreign direct investment increased from $117 million in 2002 to $214.5 million in 2003; the increase was attributed to Government concessions and incentives, an improved macroeconomic framework, and petroleum development. About $50 million has been invested in mining during the past 5 years and about $200 million has been invested in petroleum exploration. As of 2004, a total of 65 exploration permits were active, 33 of which were for diamond; 24, for gold and base metals; and 4, for petroleum (International Chamber of Commerce, 2004, p. 15).

Mauritania's mineral sector was dominated by iron ore mining and beneficiation. Most of the iron ore produced in the country was exported to Belgium, France, Germany, and Italy. Other commodities produced in Mauritania included cement, gypsum, and salt.

The Ministère des Mines et de l'Industrie is the Government agency responsible for the mining industry. Société Nationale Industrielle et Minière (SNIM) was responsible for iron ore production and beneficiation. The company operated a mining center at the northern town of Zouerate, three open pit iron ore mines at Guelb El Rhein, Kedia d'Idjill, and M'Haoudat in northern Mauritania, port facilities at Nouadhi on the Atlantic coast, and a 700-km-long railway that linked the mining center to the port facilities (Société Nationale Industrielle et Minière, 2005§).

In September, Rio Narcea Gold Mines Ltd. acquired Defiance Mining Corporation of Canada and its Tasiast gold project in Mauritania. A bankable feasibility study for the Tasiast project had been completed in April. Measured and indicated mineral resources at Tasiast were estimated to be about 12 Mt at a grade of 3.06 g/t gold, and inferred mineral resources were estimated to be

about 12 Mt at a grade of 2.25 g/t gold. Engineering and construction contracts for the project were to be finalized in 2005, with construction work expected to begin in the second quarter of 2005 and production to begin by the end of 2006. According to Rio Narcea, the mine was expected to process an average of 1.12 million metric tons per year (Mt/yr) of ore over a 9-year mine life. The company planned to mine the oxide ore during the first 3 years at an average rate of about 1.22 Mt/yr of ore and to produce about 3,400 kg/yr (reported as 110,000 troy ounces per year) of gold (Rio Narcea Gold Mines Ltd., 2005, p. 4, 12-13).

Iron ore that contained about 65% iron was mined from the Kedia d'Idjill Mine and the M'Haoudat Mine, while lower-grade ore that contained about 37% iron was mined from the Guelb El Rhein Mine (Société Nationale Industrielle et Minière, 2005§). SNIM produced 11 Mt of iron ore in 2004 compared with about 10.4 Mt in 2003. Sphere Investments Ltd. of Australia (SIL) continued working on the Guelb el Aouj iron ore project during the year. SIL, which had signed a joint-venture agreement with SNIM in October 2001 for the development of a new 18-Mt/yr iron ore mine, a concentration plant, and a 7-Mt/yr pelletizing plant to produce direct-reduction-grade pellets for export, was to spend $11 million on a bankable feasibility study to earn a 50% interest in the project.

The work program for Stage 1 of the project, which included aerial survey and mapping, drilling, hydrogeology, marketing, metallurgical testwork, and relogging of existing drill cores, was completed in 2004. According to company reports, as of October 2004, inferred magnetite-quartzite resources were estimated to be 225 Mt containing 36% iron (Sphere Investments Ltd., 2005, p. 2-5).

First Quantum Minerals Ltd. of Canada signed a Heads of Agreement with the Government of Mauritania for the acquisition of an 80% interest in the Guelb Moghrein copper-gold deposit. Under the agreement, a new company will be created, and the remaining 20% will be owned by Guelb Moghrein Mines d'Akjoujt S.A. The Guelb Moghrein deposit is located in the Inchiri region near the town of Akjoujt about 250 km northeast of Nouakchott. First Quantum was assessing the project's potential to support an operation that will produce about 30,000 t/yr of copper and about 1,600 kg/yr (reported as 50,000 troy ounces per year) of gold in the form of copper-gold concentrates that will be exported to smelters in Asia and Europe. The company expected to begin production by the fourth quarter of 2005 (First Quantum Minerals Ltd., 2004).

Rex Diamond Mining Corporation of Canada (RDM) ended its diamond exploration activities in Mauritania in August 2004 citing disappointing geophysical survey exploration results (African Mining Intelligence, 2004; Rex Diamond Mining Corporation, 2005, p. 9).

Several international oil companies, mainly Australian, were involved in offshore exploration in Mauritania in 2004. Previous exploration efforts had resulted in a series of discoveries, including the Chinguetti oilfield in 2001, the Banda oilfield in 2002, and the Tiof oilfield in 2003. Woodside Petroleum Ltd. of Australia held a 53.846% interest through production-sharing contracts in all three of these oilfields. Phase 1 of the Chinguetti project was scheduled to be completed and to produce the first petroleum by 2006 with petroleum production averaging 75,000 barrels per day (bbl/d). The Banda oilfield is located within the company's production-sharing contract for area A (PSC-A); Chinguetti and Tiof are located within the production-sharing contract area B (PSC-B). The remaining partners in PSC-A were Hardman Resources Ltd. (24.3%), BG Group plc (13.084%), Fusion Oil and Gas Company (4.615%), and Roc Oil Ltd. (4.155%); the remaining partners in PSC-B were Hardman Resources (21.6%), BG Group (11.63%), Premier Oil plc (9.231%), and Roc Oil (3.693%) (Oil & Gas Journal, 2004b; Woodside Petroleum Ltd., 2004, 2004§). In 2004, the Government awarded onshore exploration blocks for the Taoudeni Basin in northern Mauritania to China National Petroleum Company, Repsol YPF SA, Total S.A., and Woodside (Oil & Gas Journal, 2004a).

In terms of the country's basic infrastructure, about 2,100 km of the country's 10,282 km of roads was paved, 982 km was dirt road, and 7,200 km was track. Construction of the Nouadhibou-Nouakchott and Rosso-Boghe roads and a new airport at Nouakchott were underway. Mauritania had four international airports and a deep-sea harbor at Nouakchott. SNIM owned a separate harbor for exporting iron ore, and negotiations were underway with Chinese interests for the construction of a fourth dock at Nouakchott Port (International Chamber of Commerce, 2004, p. 16).

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NIGER

Niger is a landlocked African country bordered by Algeria, Benin, Burkina Faso, Chad, Libya, Mali, and Nigeria. The country's 11.4 million inhabitants share a total land area of about 1.3 million square kilometers. In 2004, the country's GDP based on purchasing power parity was estimated to be $10.5 billion and the per capita GDP based on purchasing power parity was $865 (U.S. Central Intelligence Agency, 2004§; International Monetary Fund, 2005§).

The mineral commodities produced in Niger were cement, coal, gold, gypsum, limestone, salt, tin, and uranium. In 2004, Niger was the world's fourth ranked producer of uranium after Canada, Australia, and Kazakhstan (Uranium Information Centre Ltd., 2005§). Production of uranium rose to 3,282 t in 2004 from 3,143 t in 2003 (table 1). Niger's main uranium resources are located within the sedimentary layers of the Iullemmeden Basin. Production of uranium came from two mines: the Akouta underground mine, which was operated by Compagnie Minière d'Akouta (COMINAK), and the Arlit open pit mine, which was operated by Société des Mines de l'Aïr (SOMAIR). COMINAK was owned by Compagnie Générale des Matières Nucléaires (COGEMA) of France (34%), the Government of Niger (31%), Overseas Uranium Resources Development Company of Japan (25%), and ENUSA Industrias Avanzadas, S.A. of Spain (10%). SOMAIR was owned by COGEMA (56.86%), the Government of Niger (36.6%), and Urangesellschaft GmbH of Germany (6.54%) (Antenna Netherlands, 2004§; World Nuclear Association, 2004§). Production at SOMAIR came from the Arlette, Takriza, Tamou, and Taza deposits. The company's Arlit mill, which had a uranium production capacity of 2,300 t/yr, remained partially operational during the year. Sulfuric acid was produced at the mill using imported sulfur. COMINAK's Akouta mill had a uranium production capacity of 2,500 t/yr, and sulfuric acid was also produced at this mill using imported sulfur (World Nuclear Association, 2004§).

The Samira Hill gold mine was commissioned during the third quarter of 2004. The mine produced a total of 669 kg (reported as 21,521 troy ounces) of gold during its first three months of operation in addition to the 15 kg (reported as 485 troy ounces) of gold produced during the the mine's preproduction period (Etruscan Resources Inc., 2005, p. 4; Semafo Inc., 2005, p. 1). The company that operated the Samira Hill Mine was Société des Mines du Liptako SA (SML), which was a limited-liability company owned by African GeoMin Mining Development Corporation Ltd. (AGMDC) (80%) and the Government of Niger (20%). AGMDC was, in turn, owned by Etruscan Resources (50%) and Semafo Inc. (50%). Samira Hill was located about 90 km west of the capital city of Niamey (African Mining, 2004). The two main deposits in the property were the Libiri and the Samira Hill deposits. Total measured and indicated resources at Libiri and Samira Hill were reported to be about 25.4 Mt at a grade of 1.85 g/t gold (Semafo Inc., 2005, p. 8, 12).

PETRONAS Carigali Niger Exploration and Production Ltd. [a subsidiary of Petroliam Nasional Berhad (PETRONAS) of Malaysia and Exxon Mobil Corp.] began a three-well drilling program in the Agadem Basin in September 2004. ExxonMobil and PETRONAS each held a 50% interest in the Agadem Block 1 permit. Previous exploration in the Basin had confirmed oil reserves of about 300 million barrels (Africa Energy Intelligence, 2004).

In January 2004, TG World Energy Corporation of Canada filed conciliation proceedings with the World Bank International Centre for the Settlement of Investment Disputes after the Government of Niger canceled its contract on the Tenere block and awarded the exploration rights to China National Petroleum Company (CNPC). The dispute was settled in favor of TG World, which obtained a 20% share of CNPC's participation in the acreage. The Tenere block is located within the Agadem Basin next to the Agadem block, which is held by PETRONAS and ExxonMobil (Africa Energy Intelligence, 2004; Oil & Gas Journal, 2004).

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TABLE 1
MALI, MAURITANIA, AND NIGER: PRODUCTION OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity		2000	2001	2002	2003[e]	2004[e]
MALI[2]						
Gold, mine output, gold content	kilograms	28,717 [3]	42,288 [3]	56,043 [3]	45,535 [4]	37,974 [4]
Gypsum[e]		500	500	500	500	500
Salt[e]		6,000	6,000	6,000	6,000	6,000
MAURITANIA[5]						
Cement		120,000	200,000	200,000 [e]	200,000	200,000
Gypsum[e]		100,000	100,000	100,000	34,264 [r, 4]	38,940 [4]
Iron ore:						
Gross weight[6]	thousand metric tons	11,345	10,302	9,553	10,377 [r, 4]	11,000 [4]
Iron content[e]	do.	7,500	6,700	6,200	6,890	7,200
Petroleum refinery products:[e]						
Liquefied petroleum gas	thousand 42-gallon barrels	440	440	-- [4]	--	--
Gasoline	do.	1,900	1,900	-- [4]	--	--
Kerosene	do.	470	470	-- [4]	--	--
Distillate fuel oil	do.	1,100	1,100	-- [4]	--	--
Residual fuel oil	do.	2,450	2,450	-- [4]	--	--
Other	do.	700	700	-- [4]	--	--
Total	do.	7,060	7,060	-- [4]	--	--
Salt[e]		5,500	5,500	5,500	15 [r, 4]	20 [4]
Steel, crude		5,000	5,000 [e]	5,000 [e]	5,000	5,000
NIGER[7]						
Cement, hydraulic[e]		40,000	40,000	40,000	40,000	40,000
Coal, bituminous		158,200	163,275	182,916	183,000	183,000
Gold[8]	kilograms	25	30	28	30 [r]	684 [4]
Gypsum		1,474	3,205	17,652	17,700	17,700
Limestone		60,535	103,726	146,399	146,000	146,000
Salt[e]		2,000	2,000	2,000	2,000	2,000
Sulfuric acid:						
Gross weight		52,000	55,000	62,000	67,000 [4]	70,000 [p, 4]
Sulfur content		17,000	18,000	20,000	22,000 [r, e]	23,000
Tin, mine output, Sn content		22	9	11	11	3,100
Uranium, U content		2,898	2,920	3,076	3,143 [4]	3,282 [4]

[e]Estimated; estimated data are rounded to no more than three digits; may not add to totals shown. [P]Preliminary. [r]Revised. -- Zero.

[1]Table includes data available through November 2005.

[2]In addition to the commodities listed, Mali produced clays, sand and gravel, and stone for local construction purposes in addition to diamond, marble, silver, and tin, but information is inadequate to make reliable estimates of output levels.

[3]Excludes artisanal production, which is estimated to be about 2,000 kilograms per year.

[4]Reported figure.

[5]In addition to the commodities listed, modest quantities of crude construction materials (clays, sand and gravel, and stone) presumably were produced, but output was not reported quantitatively. The minimill of Société Arabe de Fer et d'Acier en Mauritanie produced rebar and wire, but available information is inadequate to make reliable estimates of output levels.

[6]Reported by National Industrial and Mining Company.

[7]In addition to the commodities listed, phosphate rock, tungsten ore, and a variety of construction materials (clays, sand and gravel, and stone) were produced, but information is inadequate to make reliable estimates of output levels.

[8]Does not include unreported production; total output of gold was estimated to be roughly 1,000 kilograms per year.